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QRs/SPECIFICATION OF WATER TANKER OF CAPACITY 12KL
WITH FIREFIGHTING PUMP

A) SCOPE OF SUPPLY

- i) The chassis will be supplied by the manufacturer.
- ii) A 6x4, full forward control, any suitable indigenous make, BHARAT STAGE IV (EURO IV) chassis engine along with single cabin and P.T.O. with factory built cabin for 6 personnel including driver.
- iii) Fabrication and mounting of 12000 Ltrs capacity water tank as per specification.
- iv) Supply and mounting of high & low pressure firefighting pump as per specification.
- v) Supply and mounting of water monitor.

B) USE

The Water Tanker shall be used to carry the water for firefighting purposes. The pump will be driven by P.T.O.

C) DETAILED SPECIFICATIONS

1) CHASSIS

The chassis shall be suitable Indigenous make as per following specifications suitable for mounting Water Tank having 12000 ltrs capacity with pump.

- 1.1 Make of the chassis: 6x4, full forward control BS-IV or any suitable indigenous make.
- 1.2 Type: 6x4, full forward control, RHD, not less than 4500mm wheel base.
- 1.3 Engine: 6 In line cylinder, water cooled, direct injection, turbo charged diesel engine developing minimum 400 H.P. with Bharat Stage IV, (Euro IV) complying.
- 1.4 G.V.W: 25 ton.
- 1.5 Clutch: Single plate dry friction type, power assisted
- 1.6 Gear Box: Synchromesh type with crawler and reverse gear with engine P.T.O. mounted on the top of the gear box and Pneumatically operated from cabin.
- 1.7 Fuel Tank: Min. capacity of 160 ltrs minimum.
- 1.8 Final Drive: Tandem bogie with hub reduction and differential lock between axles.
- 1.9 Suspension: Leaf spring type in front and rear.
- 1.10 Brakes: Dual circuit air braking system with pneumatically operated parking brakes acting on rear axle.
- 1.11 Battery: 2x12 Volts-24V.100 Amp-Hr.
- 1.12 Tyres & Wheels: 11 Nos. of 11.00 Rx20,16 PR
Front: 2 Nos.
Rear: 8 Nos.
Spare: 1 No.
- 1.13 Steering: Integral power steering
- 1.14 Tools: a) Hydraulic jack 20 Ton with lever
b) Wheel spanner with lever
c) Standard Tool kit.
d) Tyre inflation hose.
- 1.15 Manuals (1copy): a) Workshop manual
b) Spare parts catalogue.
- 1.16 Driver Cabin: The original factory built tiltable, Driver view mirror Cabin, windscreen, side windows, doors, adjustable driver seat, fixed Co-driver seat, wiper system, Horn, complete instrument cluster, preferably in RED colour.

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WATER TANK

- 2.1 The water tank shall have a capacity of 12000 lts when fully filled and made from MS sheet confirming to IS:2062, and Rectangular in shape with round corners. The tank shall be mounted on the chassis behind the drivers cabin. The detailed design drawing of the tank with its mounting shall be submitted with tender for scrutiny.
- 2.2 The water tank shall be mounted behind the driver cabin with a gap of min.450 mm.
- 2.3 The mounting of tank shall be directly on the chassis and as per the design approved by the chassis manufacturer.
- 2.4. The tanks shall be rectangular in shape, with inbuilt forming (reinforced ribs) on both the sides. The sheet thickness shall be as follows:-
- | | | |
|----------------------|---|-----|
| Bottom | : | 6mm |
| Sides/front/Rear/Top | : | 4mm |
| Baffles | : | 4mm |
- 2.5 The approx. dimensions of the water tank shall be
- 2.5.1 Length : 5500 mm
- 2.5.2 Width : 2495 mm
- 2.5.3 Height : 1200 mm
- 2.6 The tank construction shall be such that there shall be no leakage and shall have overlapped joints of 25.4mm between the bottom sheet and side sheets. The bottom sheet corner shall be rolled upward up to a minimum of 300mm height and shall be welded to side sheets. The dimensions of the tank along with the recess for fire pump shall be clearly stated in the offer along with detailed volumetric calculation.
- 2.7 All the welding shall be by MIG welding process only. The welding of the tank shell be in such a manner that the first beading is from inside the shell and subsequent bead from outside the shell. The welded surface shall be cleaned of all slags, scale etc. There shall be minimum joints in the tank shell and hence plates used for fabrication of tank shall be of maximum size.
- 2.8 The tank shall be mounted on the chassis with minimum of four saddle supports placed as per the availability of bolt holes in the chassis frame. The details shall be submitted alongwith the offer. These supports shall be fabricated from M.S. plate of minimum 10mm thick with a reinforcement plates of 6mm thick welded to tank shell from outside to the bottom sheet up to with continuous welding.
- 2.9 M.S. plate of suitable size and thickness shall be welded to the tank mounting pedestal for mounting the tank on mounting brackets provided in the chassis frame. The plates/brackets fitted to chassis frame shall also be provided with suitable gusset plates for reinforcement.
- 2.10 The Tank shall be fitted on the chassis with the help of 5/8" dia. High tensile bolts with nylock nuts.
- 2.11 The tank shall be mounted slightly sloping towards the rear so as to decant the tank completely.
- 2.12 There shall be two circular manhole of 600mm dia. Mounted on top of the tank
- 2.13 The water tight manhole cover with good quality of rubber gasket shall be bolted to the collar of manhole. The manhole cover shall be provided with round threaded blank cap with lugs of 10" dia. with rubber gasket.
- 2.14 The tank shall be provided with suitable arrangement of baffle plates to prevent the surge of water when the vehicle is in motion and accelerating, braking in speed and covering. The arrangement of baffle plates shall be clearly shown in the drawing.
- 2.15 The baffle shall be arranged in a manner to facilitate the movement of a person throughout the tank for cleaning and welding purposes.
- 2.16 Suitable eyes shall provide on the shell of water tank to enable it to be lifted from the vehicle for repairs/replacement as and when required.
- 2.17 The tank shall be fitted with 100mm dia. Overflow pipe of 'C' class galvanized taken down below the chassis but without reducing the ground clearance.

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- 2.18 The tank shall be fitted with one 63 mm instantaneous hydrant connection with non-return valve, closed to pump panel for filling the tank throughout 50mm above galvanized 'C' class pipe.
- 2.19 A draw pipe of 100 mm dia. of 'C' class galvanized shall be taken from the tank to the pump suction inlet, incorporating 100 mm butterfly valve of flexible connection (Rubber Below) shall be provided to this pipe to take the vibrations. A suitable size sump shall be provided below the tank to connect water draw pipe with SS strainer.
- 2.20 A drain cock with 50 mm suitable ball valve shall be provided at the bottom of water tank.
- 2.21 The inside and outside surface of the tank shall be prepared with sand blasting to remove the complete corrosion of M.S. material including baffle plates and immediately two coats of Epoxy primer shall be applied from inside and outside. The tank shall be offered for inspection immediately after sand blasting is completed before epoxy primer is applied.
- 2.22 The inside surface of water tank shall be provided with two coats of anti-corrosive paint i.e. Epoxy paint.
- 2.23 A cat ladder shall be provided and fitted at the rear of water tank and fabricated out of 1" dia. M.S. tabular pipe and 2mm thick.
- 2.24 The complete top of water tank shall be covered with 10SWG aluminum chequer red plate and fixed to the frame fabricated from 40 x40 x 4 mm M.S. angles properly welded to the tank shell. The chequered plates shall be bolted to this frame and shall be removable type.
- 2.25 Suction hose brackets of aluminum sheet of 3.15 mm thick with suitable fastening arrangement shall be provided on the top deck to accommodate 4 Nos. 100 mm dia and 2.5 mtrs. Length suction hoses with male and female couplings.
- 2.26 The locker of suitable size shall be provided with doors and locking arrangement on both sides. The location and size shall be shown in the drawing. These lockers will be used for keeping delivery hoses accessories and high pressure hose reel. The structure of the locker shall be made from 40x40x4 mm thick M.S. angles with 16SWG aluminum paneling from outside and 16SWG aluminum chequered plate from inside. The floor paneling of locker shall be 10 SWG aluminum chequered plates
- 2.27 Suitable rear mudguards made from 16 SWG M.S. sheet with reinforcing ribs shall be provided and supported on M.S. brackets.
- 2.28 A suitable towing hook shall be provided at the rear of vehicle.
- 2.29 An additional draw pipe of 100 mm dia. of 'C' class galvanized incorporating 100 mm butterfly "Audco" make valve with gun metal, female suction hose coupling shall be provided to the rear side of the vehicle.
- 2.30 A suitable size recess shall be provided in the tank in the lower front side to accommodate the fire pump. The volumetric capacity of the tank shall not be reduced due to this recess and shall remain 12000 ltrs.

3. FIRE PUMP (MULTI PRESSURE)

- 3.1 The pump shall be centrifugal type, multi pressure, having output capacity of 4000 LPM at 8kg/cm² and 300LPM at 35 kgs/cm² at 3 mtrs suction lift at NTP condition. The low pressure side will be of single stage and the high pressure side also with single stage having regenerative type impeller.
- 3.2 The pump shall either be CE marked confirming to EN-1028 Part-I & II or any standard make.
- 3.3 The pump shall comply following performance parameters.
 - a) Normal Pressure output : 4000 LPM at 8kgs/cm²
 - b) High pressure output : 300 LPM at 35 kgs/cm²
 - c) Maximum pressure in : 14 kg/cm² (shut off pressure normal pressure mode).
 - d) Maximum pressure in : 45 kgs/cm² high pressure mode
 - e) Deep lifting capacity of pump: 30 cm/sec. max. upto 7mtrs in 30 sec. at NTP condition.

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- 3.4. The overall pump shall be constructed from gunmetal. The normal (low) pressure impeller, volute, and impeller wearing shall be made from gunmetal conforming to Gr.II of IS 318/1981 and the regenerative type high pressure impeller shall be of Aluminum, Bronze(AB-2). The pump shaft shall be made from stainless steel conforming to IS 6603/2001. The bearing housing will be made of C.I and all the studs and bolts coming in contact with water shall be of stainless steel. The bearings used in the pump shall be of reputed make.
- 3.5 The normal and high-pressure impeller shall be mounted on a single shaft and normal (low) pressure impeller shall be dynamically balanced.
- 3.6 The pump shall be provided with self-adjusting mechanical carbon seal assy.
- 3.7 The pump shall be provided with an inbuilt filter of easily removable type, which shall filter the water before entering into the high pressure stage impeller.
- 3.8 Operation of low pressure to high pressure or vice a versa shall be possible by actuation of single lever.
- 3.9 The pump shall have facility to operate low pressure and high pressure mode simultaneously or individually, While high pressure mode is in operation and delivering 300 LPM at 35 kg/cm² , the pressure in low pressure side shall not exceed 8.5 kg/cm².
- 3.10 The pump shall be provided in built (integrated in the pump outlet manifold) Pressure Relief Valve(PRV) which shall operate automatically and shall not allow the high pressure to increase beyond 45 kgs/cm².
- 3.11 The size of high – pressure outlet shall be of 35mm connected to high pressure hose reel.
- 3.12 The thermal relief valve (TRV) shall be provided and fitted in the pump housing, which will open when both deliveries (HP and LP) are shut off for longtime to control the temperature of pump water. The thermal Relief Valve (TRV) should open at 60C and shall reset automatically when the temperature of water is within limit.
- 3.13 The pump design shall be modular type and shall not have gaskets/packing. The arrangement shall be such that the carbon seal can be attended/removed without removing the pump body. The pump shall be provided deep groove heavy duty dual angular contact bearing immersed in oil bath.
- 3.14 The pump shall be provided with one suction inlet of 100 mm dia having round threads confirming to IS:902 of 1974 and three numbers of 63 mm delivery outlets having screw down type valves fitted with instantaneous couplings as per IS 903/1993 and one 38 mm outlet with ball valve and female instantaneous coupling. The delivery valve screw shall not be with gland. The high pressure outlet shall not less than 25mm and shall either be flange on screw type.
- 3.15 The efficiency of the pump shall be such that the power required shall not be more than available with the chassis at safe RPM for stationery and continuous operation.
- 3.16 The pump shall be midship mounted connected to P.T.O by propeller shafts and universal and slip joint
- 3.17 If required the pump shall be provided with suitable ratio inbuilt gear box to match the PTO rpm and required pump rpm.
- 3.18 All the valves used shall be of any standard make with all the piping of required size of 'C' class Galvanized.
- 3.19 Pump primer – The priming system shall be horizontal reciprocating type integrated in pump bearing housing. The priming shall be fully automatic in operation and shall not require any operation whatever from the pump operator other than throttling the engine to the required RPM. The primer shall get automatically disengage one the pump is registered the pressure. The primer shall be capable of lifting the water in 30 seconds from the depth of 7 mtrs. (upto pump inlet) at NTP condition. The pump shall attain a dry vacuum of 620 mm of Hg

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The reciprocating pistons shall be made up of stainless steel and reciprocate in self-lubricated liner bearings. The cylinder and priming valve housing shall be made from gunmetal. The eccentric cam shall be fitted on pump main shaft to operate the pistons with neoprene rubber inlet and outlet valves. The primer shall disengaged automatically at a pump pressure of 1.5 to 2.0 kg/cm²

3.20 The pump with its fitment shall be tested hydrostatically to 1.5 times the working pressure at the pump i.e. for low pressure side it shall be tested to 21 kg/cm² and high pressure side will be tested to 52 kgs/cm². This testing shall be carried out in presence of authorized representative of CISF and certificate to this effect from pump manufacture shall be submitted .

4. CONTROL PANEL

4.1 An adequately illuminated control panel shall be provided near the pump and easily accessible to operator for operating different controls. The control panel of required size shall be made from 3.15 mm aluminum sheet.

4.2 The control panel shall include the following items.

4.2.1 Throttle Control for engine

4.2.2 Pressure gauge : Low pressure: 0 to 21 kg/Cm²
(Glycerin filled) : High pressure: 0 to 70 kg/cm²

4.2.3 Compound gauge : Vacuum: 0 to 680 mm of Hg in Red.
Pressure: 0 to 10 kgs/ cm² in Black.

4.3 The pressure gauges shall be Glycerin filled with min 3" dia. Panel mounted.

4.4 High pressure hose reel circuit control

4.5 Change over lever from LP to HP mode located at convenient position.

4.6 LED level gauge/Clear acrylic glass tube, unbreakable type water level indicator calibrated on full, ¾, ½, ¼ and empty.

5. HIGH PRESSURE HOSE REEL WITH GUN

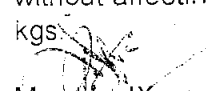
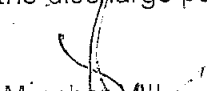
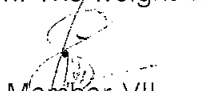
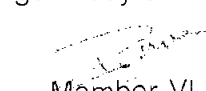

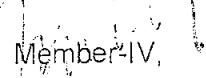
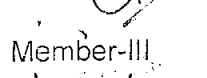
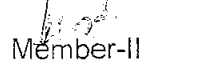

5.1 Two high pressure hose reel 60 mtrs. shall be provided an fixed at suitable location preferably in lockers . These hose reels shall be connected to H.P. out let of pump with ball valve of suitable size.

5.2 The hose reel shall be made from carbon steel/Aluminum / Stainless steel/ material with bearings/ bush made from gunmetal.

5.3 The design and size of hose reel shall be such that, it shall accommodate 60 mtrs. H.P. hose having 19.0 mm bore with quick connect couplings. The hose reel such have 40 kgs/ cm² working pressure and bursting pressure shall not be less than 120 kgs/ cm²

5.4 Additional 60 mtrs hose with quick connect coupling (male & female) of above specifications shall be supplied loose, to connect the hose reel whenever required. The loose hose shall be stored in one of the locker on during hose reel in winded condition.

5.5 The HP hose reel shall be provided with High Pressure fog/ Jet trigger type gun connect by quick connect couplings. The gun shall be made from aluminum alloy with rubber grip handle. The in let connection shall be of ¾ " BSP and shall have leak proof rotating type hose connector. The gun shall be of constant flow type and shall have discharge capacity of 150 LPM approx. The gun shall have facility to set of either spray or jet pattern reparably in handle grip. The gun shall have ability to work on pressure from 20 kg/ cm² to 40 kg/ cm² without affecting the discharge pattern. The weight of the gun assy shall not be more than 3.0 kgs.

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5. PUMP TEST

The pump fitted on the vehicle shall be subjected to various tests as detailed below.

- 6.1 The pump with its all fitments will be subjected to Hydrostatic testing on a pressure of 21 kgs/cm² to detect leakage perforation etc.
- 6.2 The pump shall be run dry for a period of minimum two minutes at 2000 RPM to check the integrity of mechanical carbon seal. After this test there shall not be any leakage of water through carbon seal.
- 6.3 The pump performance test will be carried out by running the pump at constant RPM at 2000 and measuring the discharge at various pressure.
- 6.4 The pump will be subjected to Endurance test for a period of FOUR hours continuous running. The first three hours the pump shall deliver rated output of 4000 LPM at 8 kgs/cm² and next one hour will be 300 LPM at 35 Kg/cm²
- 6.5 During the endurance test the water shall not be replenished in the cooling system and the temperature of the cooling water and engine oil should not exceed the manufacturers standards recommendations for the continuous operation and engine should not show any sign of stresses.
- 6.6 The primer shall be capable of lifting water at least 7.0 m in not more than 24 seconds and preferably be fully automatic.

7. WATER MONITOR

- 7.1 A water monitor of 2000 LPM capacity shall be mounted on the top of the vehicle between the driver cabin and water tank.
- 7.2 The monitor shall be of standard make. The output shall be set to three ranges varying from 900 to 2000 LPM.
- 7.3 The monitor shall be rotated 360° left and right and also move up and down.
- 7.4 The monitor shall be made from light alloy and shall be hard coated from inside to avoid abrasion and corrosion.
- 7.5 The monitor shall have horizontal reach of minimum 50 mtrs when supplied with water at pressure of 8 kg/cm²
- 7.6 The monitor shall be flange mounted with 80 mm butterfly valve provided at the bottom of monitor
- 7.7 The monitor pipeline shall be 'C' class galvanized pipe of 80 mm dia with suitable flanges.
- 7.8 The monitor shall be hydrostatically tested to the pressure of 16 kg/cm²
- 7.9 The monitor pipeline shall be supported suitably to avoid vibrations and cracking.

8. ELECTRICAL SYSTEM

- 8.1 All the important electric circuit shall have separate fuses, suitably indicated and shall be grouped into a common fuse box at an accessible position. The wiring shall be single pole with negative earth.
- 8.2 Suitable sized wire shall be selected for different circuits considering the current consumption for that circuit.
- 8.3 All other light, dashboard light, cabin, light lockers lights shall be of approved marked.
- 8.4 All the controlling switches of lights fitted on dashboard shall be of approved.
- 8.5 Two new Fog Lamps of approved make shall be provided and fitted on front bumper with controlling switch on dashboard.
- 8.6 Two rotating revolving beacon lamps of 24 volts, Amber colour lens duly mounted over the roof of cabin – 2 nos.

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- 8.7 24 volts DC one mile range electric siren of standard make mounted on suitable place and heavy duty push button on driver and cleaner side.
- 8.8 Two-tone hooter cum P.A. System having 25 watt capacity with speaker mounted on the cabin roof and amplifier in the cabin.
- 8.9 Illuminated sign board with letter "FIRE " over the cabin.

9. PAINTING

- 9.1 The complete super structural members shall be painted with two coats of Red Oxide primer, and two coats of chassis Grey paint.
- 9.2 The complete external and internal aluminum paneling lockers shall be painted with two coats of Zinc Chromate paint.
- 9.3 The complete exterior of the vehicle shall be painted with two finish coats of "RED" Polyurethane" paint. The paint shade shall be similar to cabin shade.
- 9.4 The complete internal surface of water tank shall be prepared by sand blasting and immediately applied two coats of Epoxy primer and two coats of Epoxy paint including baffle plates.
- 9.5 The complete under chassis painting shall be carried out.
- 9.6 The words "Central Industrial Security Force" Fire Service Training Institute " in English shall be painted on both sides of vehicle on the water tank in a suitable size letters in Golden Yellow paint with Black colour shading.

10. ACCESSORIES

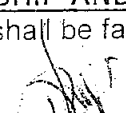
- 10.1 Quick removable type wire mesh guard shall be provided to wind screen glass.
- 10.2 Four aluminum hooks for keeping the uniform clothing shall be provided in drivers cabin.
- 10.3 A wireless set box made from 14 SWG aluminum sheet with lid shall be provided just behind the fireman seat with 1/2" wooden plank for fitting the wireless set. The design and mounting will be shown at the time of fabrication work.


11. STABILITY


The stability of the vehicle shall be such that when fully laden and equipped (but excluding crew), the surface on which the vehicle stands is tilted to either side, the point at which overturning occurs shall not be less than 25 degree angle from horizontal.

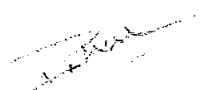
12. WORKMANSHIP AND FINISH

The vehicle shall be fabricated, painted with standard workmanship.



 (Balwant Singh)
 Inspector/SSB
 Member- IX

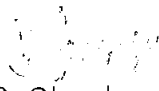

 (S.K. Tyagi)
 AC(MTO)/TBP
 Member- VIII



 (Sanjeev Kumar)
 Team Comdr/NSG
 Member- VII



 (Raj Kamal Malik)
 AC/NDRF
 Member- VI



 (A.K. Malik),
 DO(FPW)/Delhi Fire service
 Member- V


 (B.S. Kaurav)
 DC(MT)/BSF
 Member- IV


 (J.S. Chauhan)
 DC/CRPF
 Member- III


 (Dr. M. M. Gosal)
 S.SA, BPR & D
 Member- II


 (J.S. Yadav)
 AIG/Fire (CISF)
 Member- I


 (A.Y. PRIYA)
 Dy. Inspector General/Fire
 Presiding Officer

